SECTION III.—FORECASTS.

FORECASTS AND WARNINGS FOR AUGUST, 1918.

By ALFRED J. HENRY, Supervising Forecaster.

PRESSURE DISTRIBUTION OVER THE NORTH PACIFIC AND ALASKA.

Pressure at Midway Island was above normal from the 5th to the 13th and again from the 19th until the end of the month. There were but two periods of low pressure, the first reached its minimum on the 4th and the second on the 16th. At Honolulu pressure was quite uniformly below the normal, as in previous months.

Pressure at Alaskan stations was generally below normal from the 1st to the 11th, the greatest depression occurring about the 9th. There was, however, a slight rise to normal and a little above from Valdez south to San Francisco on the 4th and 5th. After the 11th pressure alternately rose and fell, the amplitude of the rises and falls being small and probably without significance so far as the weather in the United States is concerned.

In the United States the principal rise in pressure occurred in connection with High area No. IV–A. This HIGH can not be traced back to Alaska or the Canadian Northwest; we are therefore constrained to believe that it originated in the Hudson Bay region and moved thence southeastward.

WEATHER OF THE MONTH.

The rainfall was quite irregularly distributed, many places receiving moderately heavy rains, while drought more or less severe prevailed in other places, especially in northeastern districts. East of the Rocky Mountains temperature was considerably above normal, the greatest excess being in the middle Mississippi Valley; west of the Rocky Mountains relatively cool weather prevailed. The intense heat in the Great Central Valleys during the first decade was the conspicuous event of the month. (*See* p. 361, this REVIEW, for details of this event.)

HIGHS.

Eight HIGHS have been plotted on Chart II, six of which were of North Pacific origin and the remaining two evidently originated in northern Manitoba. The North Pacific HIGHS seem to have been offshoots from the subpermanent HIGH that overlies the Pacific west of the Washington and Oregon coast. Numbers II and IV did not pass wholly across the continent, thus confirming the belief held by many forecasters that unless central pressure in a North Pacific HIGH in summer is above 30.20 inches it will not persist long enough to cross the interior of the continent. Pressure was high on several occasions along the West coast but there was no progressive movement. The first of these stationary highs appeared at Triangle Island on the 11th with initial pressure of 30.28 inches. The second stationary HIGH appeared at North Head, Wash., on the 22d, with central pressure of 30.30 inches. Surface pressures in both of these HIGHS gave no indication of a progressive eastward movement.

High area numbered IV–A was the most pronounced HIGH of the month. As HIGH No. IV reached the upper Lake Region on the 15th its eastward movement ceased. At this time rising pressure over northern Manitoba indicated the formation of an independent HIGH. By the morning of the 16th pressure at Salt Ste. Marie, Mich., had risen to 30.22 inches, and at Cochrane, northern Ontario, to 30.20 inches. On the p. m. map of the 16th pressure had fallen at both Cochrane and Sault Ste. Marie, but on the morning of the 17th pressure had risen at the first-named to 30.36 inches, and continued rising during the next 24 hours, reaching a maximum of 30.46 inches on the morning of the 17th. Central pressure in this HIGH continued to increase, reaching 30.52 inches at Canton, N. Y., on the morning of the 19th. At that time this HIGH was probably the controlling factor of the weather over the northern and central portions of the American continent. The failure of the stationary areas of high pressure hereinbefore mentioned to progress eastward seems to have been due to the blocking effect of HIGH No. IV–A in the St. Lawrence Valley and New England.

It seems to be established that the progressive movement of LOWS is at times greatly diminished by the pressure distribution 1,000 miles or more to the eastward; there is therefore no apparent reason why the eastward progression of HIGHS should not be retarded or even suspended temporarily by the pressure distribution far to the eastward.

LOWS.

Thirteen LOWS classed as follows have been plotted on Chart III: Alberta, 6; Central, 3; North Pacific, 2; Northern Rocky Mountains, 1; Atlantic coast (south of Virginia) 1, and one tropical disturbance plotted as No. III. In addition to these, many shallow barometric depressions with weak or but imperfectly developed cyclonic circulation were observed at various times during the month in some part of the Rocky Mountain and Plateau regions or in the upper Mississippi and lower Missouri Valleys. Pressure in the last-named district was abnormally low during the greater part of the month, and that region seemed to be the locus of origin of shallow depressions, as, for example, No. I–A, V–A, and XI–A, all secondaries developed in the southwest quadrant of depressions that moved east-northeast over Canada north of the field of observation. This seems to have been the outstanding feature of the movement of LOWS during August, 1918.

Low No. X apparently developed on the Carolina coast during the night of the 23d. On the morning of the 24th the center was at Wilmington, N. C., and the pressure was decreasing rapidly at that place but not at surrounding stations. Storm warnings were ordered for the North Carolina and Virginia coasts and the further development of the disturbance was awaited. Rather unexpectedly the disturbance moved very slowly—about 8 miles an hour for the first 24 hours—reaching the Virginia Capes on the morning of the 25th. Its subsequent movement was probably northeastward over the Gulf Stream. The storm, while severe on the immediate coast, did not extend more than 50 miles inland. Considerable damage was done at beach resorts and towns along the North Carolina and Virginia coasts.

The unprecedented heat from a forecasting standpoint is treated elsewhere in this REVIEW, page 361.

TROPICAL DISTURBANCES.

Tropical storm, August 1–6.—The center of this storm did not pass near any observing station and it was not encountered by any vessels navigating the Caribbean Sea and Gulf of Mexico. The cable reports of the 1st showed that a disturbance was evidently south of Bridgetown, Barbados. The disturbance moved west-northwest, passing to the south of Jamaica some time in the afternoon of the 3d.

It seems to have passed across the Yucutan Peninsula or possibly through the Yucutan channel Sunday afternoon, and was not again observed until Tuesday morning, when falling pressure and freshening winds from the southeast indicated that it was approaching the Gulf coast. Advices of the presence of a tropical storm had been previously given. It now remained, however, to determine the probable point of contact with the coast. At 1:30 p. m. the following advices were issued:

Hoist hurricane warning Louisiana and Texas coast from Galveston east. Disturbance probably strike the coast between Galveston and mouth Sabine River.

The hurricane struck the Louisiana coast a few miles east of Calcasieu Pass, or about 30 miles east of the mouth of the Sabine. The path is indicated on Chart III. The storm passed a little west of north through the parishes of Cameron, Calcasieu, and Beauregard, La., and thence into Newton County, Tex., near where the Gulf Coast Line Railroad crosses the Sabine River—a total distance of about 80 miles.

Following is a detailed account of the storm prepared by Assistant Forecaster R. A. Dyke, New Orleans, La.:

The first indications of the disturbance were the cirrus and cirrostratus clouds, recorded in observations in the early afternoon and evening of the 5th and the early morning of the 6th. At New Orleans, within the two hours following 7 a. m. on the 6th, lower clouds accumulated and the cirrus clouds were soon hidden from view.

The pressure distribution over the United States on the 5th was such as is usually accompanied by southeast winds at New Orleans, and southeast winds prevailed from 11 a. m. of the 5th to 2 p. m. of the 6th, after which the wind was from the south. The fact that the disturbance did not cause northeast or even east winds at New Orleans during any time while it was moving northwestward across the Gulf is one indication of its small diameter, for the general pressure conditions exercised only a weak influence on the direction of the wind. The wind velocity, when the storm was nearing the coast, did not exceed 34 miles an hour at Burrwood and 25 miles at New Orleans. The direction of the wind at Burrwood was very similar to the direction at New Orleans except that it was east at Burrwood at the 7 p. m. observation of the 5th.

The center of the storm reached the Louisiana coast a few miles west of the village of Creole, and east of Calcasieu Lake, in Cameron Parish. It moved in a straight line in a NNW direction, passing near or through Westlake, a town just west of the city of Lake Charles. Slightly west of De Quincy it crossed the Sabine River into Texas a few miles below Merryville, La. At this point the storm was probably diminishing, though still violent, as is shown by the destructive winds at Merryville. The length of this path is about 90 miles, and if we consider the respective shifts of the wind from east to southeast at the ends of the path, which occurred about five hours apart according to reports received, the approximate average rate of progress over this portion of the course of the storm was 18 miles per hour.

The area in which considerable destruction occurred was about 25 miles wide, and winds of great force lasted only two to three hours. The storm was about 100 miles in diameter, but approaching the outer edges the damage was slight or entirely absent.

Besides the wind record at Port Arthur, Tex., on the western edge of the storm, we have the partial record at Lake Charles, where the velocity increased on the 6th from 12 miles an hour at 8 a. m. to 24 miles at noon, 36 miles at 2 p. m., 48 miles at 2:30 p. m., and 80 miles an hour in the five-minute period terminating at 2:58 a. m., with an extreme velocity of at least 100 miles an hour. It was at this point that the anemometer was put out of service by the wind or flying débris.

We have not succeeded in obtaining reports of barometer readings within the hurricane.

Two reports of tides have been received. At Johnsons Bayou, 10 miles east of the mouth of Sabine Pass and 28 miles west of Calcasieu Lake, the tide was 2 feet and 5 inches above normal. At Morgan City the tide rose 3 feet. Between these points the tide was doubtless somewhat higher, especially along the coast in the eastern portion of Cameron Parish.

The distribution of rainfall was rather uniform, being in the neighborhood of 2 inches at most places within the storm area and slightly exceeding this just outside the storm area and near the coast. Very few reports of thunder and lightning were received and these were not from places close to the center of the storm. Many persons within the area of violent winds stated that there was no thunder or lightning.

Thirty-four deaths are reported as due to the storm and the number of persons injured is more than twice that number. Eleven deaths occurred at Lake Charles and three at Gerstner Field. The other deaths were in Cameron Parish and in small towns near the center of the storm.

The damage to property is roughly estimated at $5,000,000. This includes damage at Lake Charles, Gerstner Field, and Sulphur, La., and to crops and standing timber; but it does not include losses from dwellings blown down in numerous villages, and live stock, possibly numbering a hundred, drowned in Cameron Parish. A mail and passenger steamboat was sunk in Prien Lake on the trip from Cameron to Lake Charles, but the passengers were saved and the boat can probably be refloated, as it sank in shallow water. Some indirect damage resulted from fires, fortunately not extensive, though causing the loss of a few very valuable properties. The greater part of the rice crop was not sufficiently advanced to suffer much damage, and was benefited by the needed rains. Where cotton and corn are grown there were considerable losses.

Summer time (75th meridian) is used in this report.

Second tropical disturbance.—The second tropical disturbance of the month passed Barbados, moving to the west, during the forenoon of the 22d. The maximum wind at Bridgetown was 48 miles from the southeast and the lowest pressure 29.84 inches. These data, however, are inconclusive as to the distance of the center from that point. During the next 72 hours reports from land stations merely indicated a disturbance over Central Caribbean region probably of little intensity. On Sunday morning, August 25, the observer at Kingston, Jamaica, reports: "Center passed south Jamaica moving west yesterday afternoon." Subsequent reports indicate that the disturbance, much diminished in intensity, passed inland over Honduras Sunday night and dissipated over that region during the next 48 hours. The weather over the western Caribbean was unsettled with low pressure for the remainder of the month.

Both disturbances moved with rather high speed, the average being perhaps slightly above 15 miles per hour. The average rate before recurving is about 12 miles per hour.

WARNINGS FROM OTHER DISTRICTS.

Chicago, Ill., forecast district.—No warnings were issued during the month.—*Ernest H. Haines, Meteorologist.*

New Orleans, La., forecast district.—A tropical storm moved into western Louisiana during the afternoon of August 6, for which warnings were issued as follows: Northeast storm warnings were ordered for the Louisiana coast, 8:40 a. m., northwest storm warnings for the Texas coast, 12:30 p. m., and hurricane warnings for the Louisiana coast. No other storm occurred, and no further warnings were issued during the month.—*I. M. Cline, District Forecaster.*

Denver, Colo., forecast district.—Low barometric pressure prevailed during the fore part of the month, attended by frequent showers in large portions of the district. The weather was generally fair during the latter half of the month under the influence of moderately high pressure. Cool weather for August predominated in the western part of the district. No general warnings were issued.—*Frederick W. Brist, Assistant Forecaster.*

San Francisco, Cal., forecast district.—Much unsettled weather prevailed in this district during the first half of

August, but rainfall was light and mostly confined to mountain localities. Temperatures during this period were as a rule slightly below normal. Beginning about the 15th a rainy period occurred in the North Pacific States that lasted a week, and following this temperatures above normal prevailed in all sections until the close of the month. Rain came too late in the North Pacific States to benefit grain and early planted truck crops, but it was of immense value in putting out forest fires and preventing new ones from starting. Prior to this rainy spell the forest fire hazard was acute, owing to the previous long dry period, which followed a winter of light snowfall in the mountains. When the snowfall is light in the mountains vegetation on their slopes dries early in the season. In consequence the fire risk covers a longer period, thus making possible a greater number of fires as well as enhancing the difficulties to be met in keeping them under control.

Fire-weather warnings were issued on the 12th, 20th, and 30th for high temperatures and gentle winds, and on the 14th the Forest Service people were advised that conditions were favorable for thunderstorms in the mountains during the next day or two. These warnings were all verified and undoubtedly served a useful purpose. On August 1 small-craft warnings were issued for Tatoosh Island and Neah Bay only. No other warnings were ordered during the month, and none were needed.—*E. A. Beals, District Forecaster.*